DOCUMENT RESUME

ED 152 428 PS 009 852

AUTHOR Vopava, Judy; Boyce, Jacqueline
TITLE Comparison of the Long-Term Effects of Infant and Preschool Programs on Academic Performance.
PUB DATE Mar 78
NOTE 19p.; Paper presented at the Annual Meeting of the American Educational Research Association (Toronto, Canada, March 27-31, 1978)

EDRS PRICE MF-$0.83 HC-$1.67 Plus Postage.
DESCRIPTORS *Academic Achievement; *Comparative Analysis; *Demonstration Programs; Dropout Rate; *Followup Studies; Grade Repetition; Infants; *Preschool Education; Preschool Programs; Program Content; *Program Effectiveness; Special Classes

ABSTRACT

This paper presents a follow-up study of the academic performance of children who had previously participated in one of eight experimental infant or preschool education projects. The initial phase of the study compared grade retention, special class placement and school dropout rates of the experimental program children with those of children in control classes. Results indicated lower rates of academic problems for all except one of the experimental programs. In an attempt to analyze which kinds of programs were the most effective, the second phase of the study correlated 25 variables intuitively related to program effectiveness with academic performance. These variables included length of program, size of groups, staff variables, and parent involvement among others. For this analysis, 21 individual programs sponsored by the eight projects were identified and analyzed. Results of this analysis indicated the most significant correlations between age of entrance into the experimental program, parental involvement, goals for parents, home visits, and adult/child ratio and placement in special education classes. It is suggested however, that more sensitive analysis and further research are necessary to clarify the exact nature of these relationships. (BD)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

ED152428

Comparison of the Long-term Effects of Infant and Preschool Programs on Academic Performance

Judy Vopava and Jacqueline Royce

Department of Community Service Education

Cornell University

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

Judy Vopava

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC) AND USERS OF THE ERIC SYSTEM."

Paper presented as part of a Symposium on Early Intervention Programs at the annual meeting of the American Educational Research Association, Toronto, March 27, 1978.

PS009852

Duplicated in U.S.A.

Improving school performance is one of the goals of most early education programs. Thus, some of the most important data collected by the Consortium were measures of how well or how poorly the children were doing in school. In terms of school performance, two very significant failures for a child are being placed in special education classes and being retained a grade in school. We have reported previously (Lazar, et al., 1977) that children who participated in the Consortium programs were much less likely to be placed in special education classes or to be retained a grade in school than were control children. For those of you unfamiliar with these findings, let me take a moment to show you our most recent results on these two variables. Because different school districts use different policies to assign children to special education or to retain them a grade, we compared program and control groups within a single project. Here is a graph (Figure 1) showing the percentages of program and control children in special education classes. The diagonally-striped bars represent program children, and the shaded bars, control children. As you can see, in every project except that of Dr. Miller, program children were placed in special education classes less often than control children. When we pool these results across projects, the two-tailed significance level is a striking .0002.

The retention results are shown in the next graph (Figure 2). In general, program children are less likely to be retained than control children, although again in Dr. Miller's project, the

results are in the opposite direction. Pooling across projects produces a small but significant difference in favor of the program children with a two-tailed significance level of .01. A more detailed discussion of these results will be published this year in a chapter of a book by David McClelland called Education for Values (Koretz, et al., 1978).

Given that the Consortium projects have been effective in improving school performance, we might ask another important question. That is: "What kinds of programs are most effective in improving school performance?" To answer this question, we need to rate programs on variables related to program type, and then observe whether such variables are related to effectiveness. Since many projects had different types of programs at a single site, we chose to use these individual programs within a project as the unit of analysis. We will call these individual programs subgroups. The special education analysis included one subgroup from Beller's Philadelphia Project, two each from Gray's Early Training Project and Weikart's Perry Preschool, three each from Gordon's Parent Education Project and Levenstein's Mother-Child Home Project, and five each from Karnes' and Miller's experimental curriculum variation projects, for a total of 21 subgroups. The retention analysis included these 21 subgroups as well as six subgroups from Palmer's Harlem Training Project on which special education information was not available.

For each program subgroup and control group, we computed the proportion placed in special education and retained in school. Even though children were randomly assigned to program subgroup or control group in most projects, some differences between program and control groups were found on pretest IQ. Thus we adjusted these proportions for pretest IQ.* Each subgroup was given an effectiveness rating by subtracting the (adjusted) proportion of the appropriate control group from the similar proportion of that subgroup. This measure is equivalent to computing a partial correlation between program-control status and placement in special education (retention) holding pretest IQ constant. It is the expected difference between the program subgroup and control group if they had equivalent pretest IQ means. In most cases, the expected differences were very similar to the observed differences. (See Table 1.) Thus this measures of effectiveness indicate the percent of reduction in special education assignment or retention due to the program. We did not adjust the subgroups from Gordon's project for pretest IQ since most of the children in his project had not been administered an IQ test before they began the program, and for the few children who had

---

*This was done by regressing the dependent variable (either special education or retention) on pretest IQ and program-control status for each subgroup and its respective control group. We then subtracted, from each proportion, the product of themean pretest IQ for that subgroup and the weight of pretest IQ from the above regression equation. This was also done for each control group; however, a control group had somewhat different adjustments depending on which subgroup it was being compared to. This is because the regression weight would be somewhat different for different subgroups.

been pretested, control children had a higher mean pretest IQ than program children. All six of the subgroups within Palmer's project were adjusted based on the pretest IQ scores of the two subgroups which had taken a pretest. Miller's subgroups were not adjusted for pretest IQ since the first IQ test she administered was about three months after the program had started.

Karnes' subgroups could not be compared to a control group since none existed. Instead we compared the proportions in each subgroup to the proportions in her five subgroups combined. This would tend to make her subgroups look less effective than those of other projects, since presumably her program subgroups had fewer children placed in special education or retained than a control group would have. But at the same time, we felt that her project might contribute to this analysis since her program groups differed on many important program variables. Consequently, the analysis described below has been performed twice, once including Karnes' subgroups and once excluding them. I will note any discrepancies as I go along.

We rated the subgroups on 25 program variables. The continuous variables were age at beginning of intervention; four variables related to the length of the program -- total number of months in the program, total number of years in the program, months per year in the program, hours per year in the program; adult-child ratio, adult contact hours per year (that is, hours per year divided by the number of children per adult), and size of the group the child

was in. Each subgroup was also rated on several dichotomous variables depending on whether or not the following components existed in that program: goals concerning parents, home visits, center-based settings, professional staff, para-professional staff, volunteer staff, staff preservice training, affective goals, psychomotor goals, language goals, cognitive orientation, behavioral orientation, traditional orientation, and socio-emotional orientation. Finally, programs were rated as being low, moderate, or high with respect to teaching structure, language emphasis and parental involvement. These variables are the same as those used in our final report of last year (Lazar, et al., 1977). Many of the variables were taken from the work of Goodson and Hess and Gordon, et al. (1975).

Before we describe the results, we would like to insert a word of caution. First of all, each investigator rated his or her programs. Although we have absolute confidence in the integrity of the investigators, we can not be sure that they used the same standards of measurement. For example, one person might describe a program as having a high emphasis on language while another might describe that same program as having only moderate language emphasis. Ideally, programs should be rated by a single person with well-defined standards of measurement or a group of people with high inter-observer reliability.

Secondly, the 25 variables listed above are highly inter-correlated, and thus confounded. Suppose, for example, that program

with high language emphasis and a behavioral orientation tended to be more effective than programs with low language emphasis and no behavioral orientation. Suppose also that there is a high correlation between language emphasis and behavioral orientation; that is, most of the programs that had high language emphasis had a behavioral orientation and most of the programs with low or moderate language emphasis did not have a behavioral orientation. In such a case we would not be able to tell whether effective programs were due to language emphasis or behavioral orientation or both. Thus the results to be described are tentative findings which need to be confirmed by future research with experimental designs that allow the effects of these different program variables to be separated.

The analysis consisted of computing Pearson correlations between each program variable and placement in special education or retention. We created a third measure of effectiveness as well which we thought might be a more powerful measure than either special education or retention along. We called this third variable "Achiever." Children were academic non-achievers if they had ever been placed in special education classes, been retained in grade, or dropped out of school. Children who had not suffered any of these three "academic failures" were called achievers.

Let me briefly describe what a correlation between a program variable and one of our effective measures would show. If the program variable is a dichotomous one such as preservice training, the correlation between it and special education placement is equivalent to doing a t-test between two types of programs --

programs where staff had preservice training and programs where staff did not have such training. The dependent variable for such a t-test is percent reduction in special education. A high positive correlation would mean that preservice training of staff was likely to produce greater reductions in the number of program children placed in special education. We used correlations, rather than t-tests, because some of our program variables were not dichotomous.

Since 25 correlations were computed for each measure of effectiveness, the two-tailed significance levels of the correlations were multiplied by 25 to get the corrected significance levels reported here. This is the Ryan or Bonferroni method of correcting for multiple comparisons mentioned earlier by Dr. Darlington.

None of the program variables were significantly related to retention. However, using placement in special education as the measure of effectiveness produced several significant findings. The age at which children began the program was negatively related to effectiveness, $r=-.6377$, $p=.05$. Thus we have some evidence to indicate that the younger the child the more effective the program. Programs that included goals for parents were more effective than those that did not, $r=.8293$, $p=.025$. Likewise, programs with visits to the home were more effective than programs without such visits, $r=.6375$, $p=.05$. The number of children per adult had a negative correlation of $-.8298$ with effectiveness, $p=.025$, thus implying that the more children per adult, the less effective the program. This variable was the single most effective variable. When Karnes' subgroups were excluded, the effectiveness correlation

was an even higher one, r=-.9115. Parental involvement was also an important variable. More effective programs tended to have higher parental involvement than less effective programs, r=.6024, p=.010. One counterintuitive result is a negative relationship between hours per year and effectiveness, r=-.7332, p=.025. Without Karnes' subgroups, this correlation is an even higher -.9028. The number of adult contact hours was also negatively related to effectiveness, though only when Karnes' subgroups were excluded, r=-.8027, p=.025. Finally, programs with affective goals tended to be more effective, r=.5861, p=.125. This result was more apparent when Karnes' subgroups were excluded, r=.7519, p=.025.

The results using achiever as the dependent variable are similar to, but much weaker than, the special education results, thus I will not go into them. Since using placement in special education as the measure of effectiveness produced the strongest and most interesting results, I would like to discuss those effectiveness correlations in more detail. Beginning age, home visits, goals for parents, children per adult, and parental involvement are highly intercorrelated variables. The correlations among these variables ranged from a .52 relationship between parental involvement and beginning age to a .93 relationship between the adult/child ratio and parental goals. In addition, the affective goals variable had moderate relationships, from .42 to .60, with the other five variables. Thus we can say that the most effective programs were those where one intervenor worked with an infant or toddler and his/her parent in the home. These

same programs also tended to have fewer contact hours and fewer adult contact hours per year with each child. For example, total contact hours had a high correlation of .80 with the adult/child ratio. When the adult/child ratio is controlled, the number of total contact hours and of adult contact hours no longer have an effect. (Partial r's are -.2020 and -.1627 respectively.) Similarly, the effect of affective goals on a program was eliminated if any one of the other five variables (beginning age, parental goals, home component, children per adult and parental involvement) were controlled.

Thus we can say that age, parental involvement, goals for parents, home visits and adult/child ratio are related to program effectiveness. Two of these variables -- the adult/child ratio and the goals for parents -- correlated about .83 with reduction in special education placement. The other three -- beginning age, parental involvement, and home visits -- have slightly smaller correlations, between .60 and .64. If we control for the first two, the last three no longer differentiate programs on effectiveness. The reverse is not true, however. That is, controlling for age or home visits or parental involvement still produces relationships between effectiveness and the variables of children per adult and goals for parents. Because of the high intercorrelations of these five variables, it is somewhat dubious to say which are actually causing effective programs. However, it is reasonable to conclude that at least one of these five aspects of programs are producing the greater reductions in special education.

The evidence suggests that variables such as teaching structure, types of orientation and goals don't differentiate programs. Nor do agent-type variables (except for parent, non-parent) such as whether the teacher is a professional, para-professional or volunteer. Similarly, variables like length of program don't seem to be related to program effectiveness. Of course this is somewhat inconclusive, since we would need to control for the 24 other variables in order to conclude that a variable made no difference in effectiveness. Obviously it is impossible to control for 24 variables when we have only 21 subgroups. Furthermore, variables such as the kinds of goals or orientations a program has are rather insensitive measures. A better way to differentiate programs in terms of their content would require that observers rate the amount of time that a program spent on various activities. More sensitive ratings such as these might produce differences in terms of effectiveness.

It is important to remember that almost all of these programs are effective in reducing the percentage of children in special education. Thus we are not saying that all programs should be for young children in the home with high parental involvement. For example, the most important aspect of a program might be parental involvement so that a center program with high parental involvement might be as effective as an equivalent home program (and also less costly). Or programs for preschoolers in the home might be as effective as those home programs for infants and toddlers. Research

comparing center to home programs for preschoolers as well as infants and toddlers would really be a welcome addition to these results. Similarly, we would like to encourage further research which better differentiates curricular aspects of infant and preschool programs.

Figure 1. Percent of Program and Control Children in Special Education

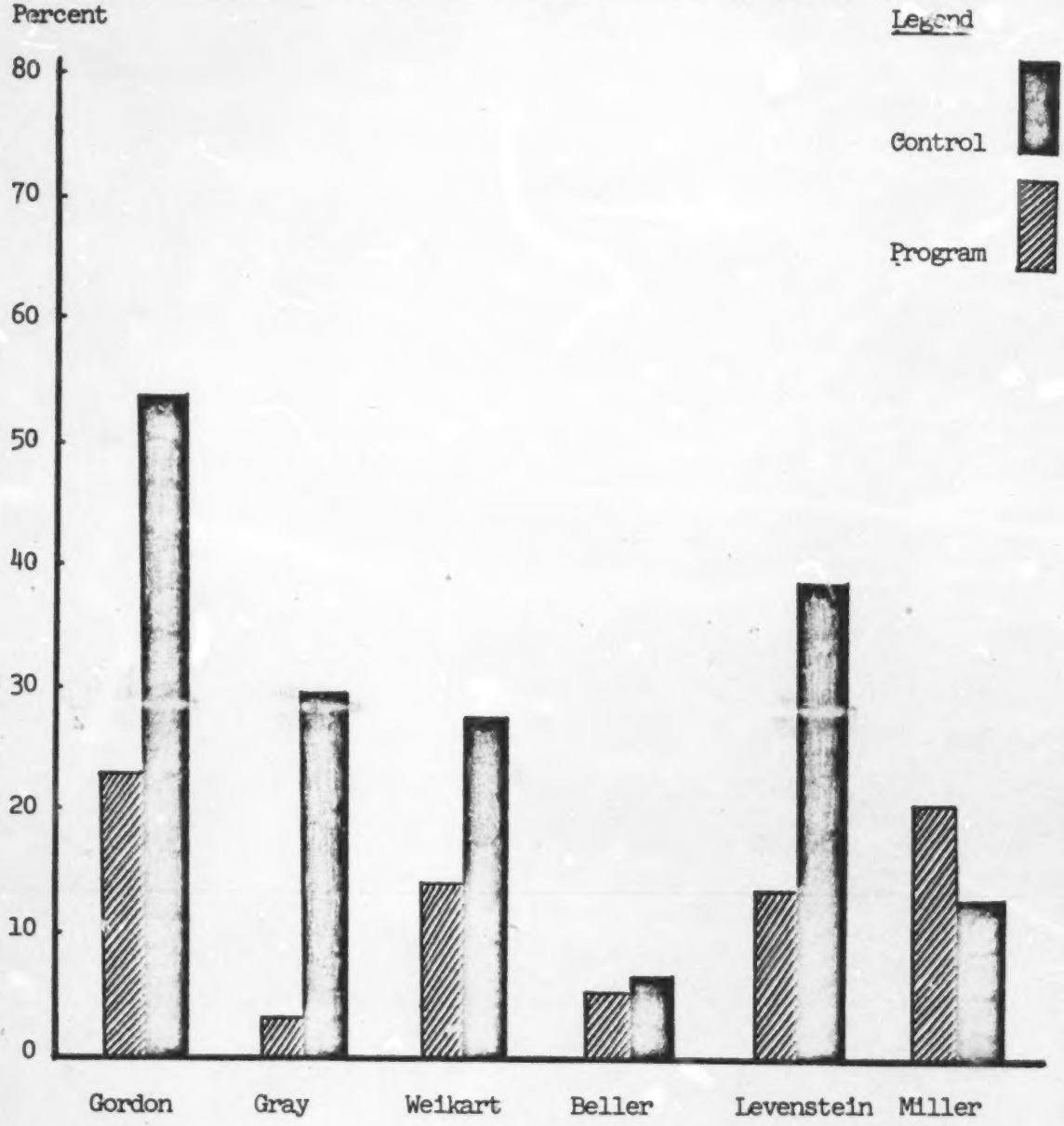

Figure 2. Percent of Program and Control Children Held Back a Grade

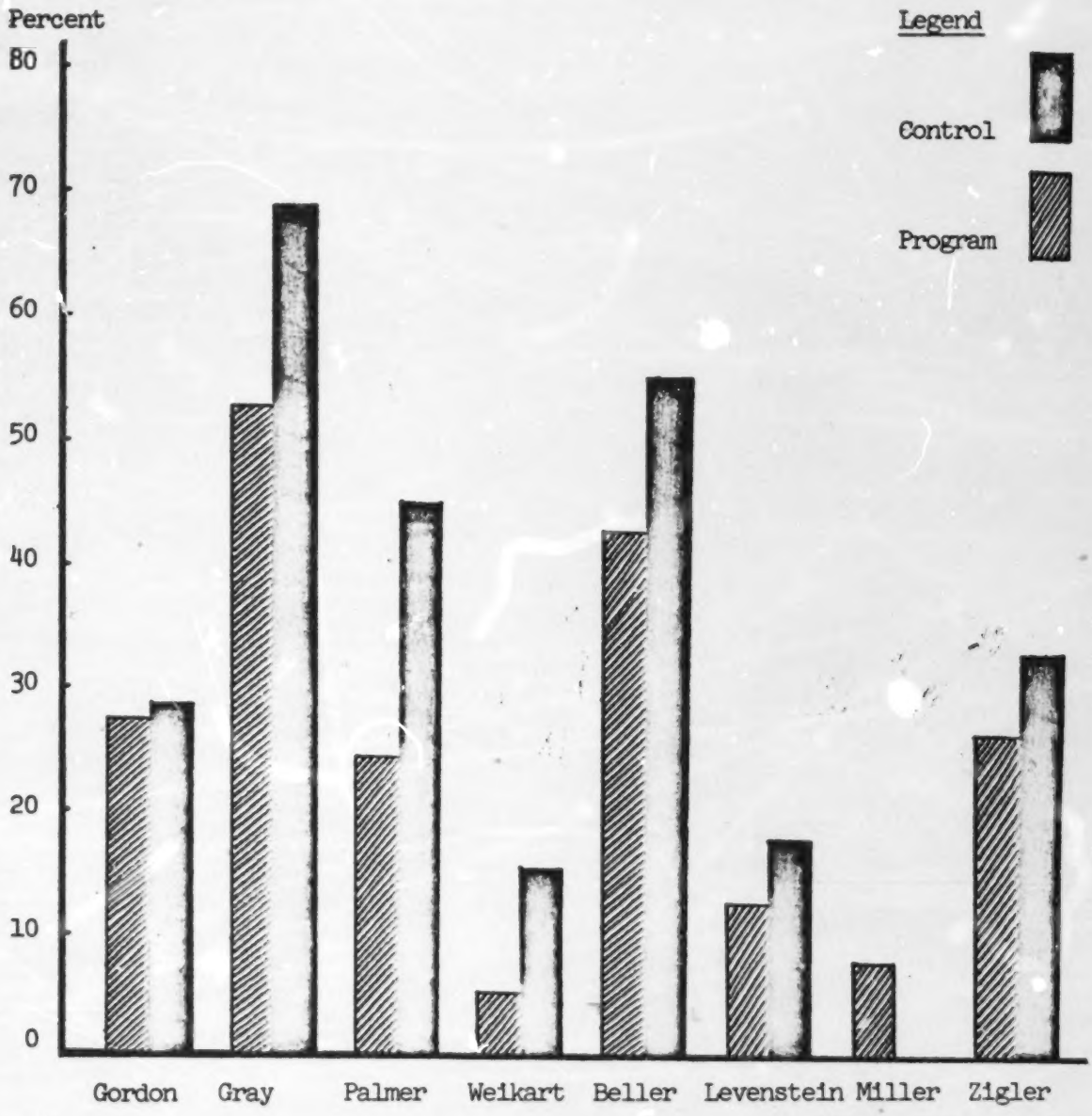

Table 1

Differences Between Program Subgroups and

Control Groups on the Proportion in Special Education

Project	Subgroup	Observed Difference	Adjusted Difference
(01) Beller T_1	Preschool	0.008	0.007
(03) Gordon $T_{1,3,4}$	One year home visits; 2rd year home visits and home learning center	0.234	0.234
$T_{2,5,6}$	One or two years of home visits only	0.371	0.371
T_7	One year of home visits and home learning center	0.332	0.332
(4) Gray Early Training Project			
T_1	Two year program	0.241	0.250
T_2	One year program	0.294	0.294
(06) Karnes T_1	Traditional	-0.010	0.002
T_2	Bereiter-Engelmann	-0.137	-0.139
T_3	GOAL	0.111	0.077
T_6	Montessori	0.169	0.159
T_7	Comm. Int.	-0.126	-0.101
(07) Levenstein			
$T_{1,16}$	One year program	0.266	0.257
$T_{5,7,8}$	Two year program	0.224	0.203
$T_{15,14}$	One full year and one short year program	0.391	0.383
(08) Miller T_9	DARCEE	0.025	0.025
T_1	DARCEE with home visits	-0.250	-0.250
T_2	Bereiter Englemann	-0.106	-0.106
T_3	Montessori	-0.051	-0.051
T_4	Traditional	0.0	0.0
(10) Weikart/ Perry Preschool T_1	Two years	0.144	0.129
T_2	One year	0.123	0.124

Table 2

Effectiveness Correlations for Special Education

	Correlations with Karnes	Correlations without Karnes	Significance Level
Age	-.6377	-.6262	.002
Total Months	.4210	.4453	.057
Months/Years	.3487	.2713	.121
Goals for Parents	.8293	.8527	.001
Home Visits	.6375	.6117	.002
Center	-.5645	-.5525	.008
Children/Adult	-.8298	-.9115	.001
Professional Staff	-.5014	-.4789	.021
Paraprofessional Staff	-.3666	-.3675	.102
Volunteer Staff	.2115	.1409	.357
Preservice Training	.3229	.1353	.153
Psycho-Motor Goals	.3606	.3148	.108
Language Goals	.0968	.0669	.676
Teaching Structure	-.0258	-.0580	.912
Language Emphasis	-.2393	-.0629	.296
Cognitive Orientation	.3529	.2826	.117
Behavior Orientation	-.3094	-.3775	.172
Traditional Orientation	.0221	.1377	.924
Socio-emotional Orientation	.2211	.1377	.336
Parent Involvement	.6024	.6038	.004
Hours/Year	-.7332	-.9028	.001
Adult Contact Hours	-.5268	-.8027	.014
Child Group Size	-.1518	-.2221	.511
Years	.3319	.3989	.142

Note: All significance levels are two-tailed, uncorrected, and for the correlations which include Karnes' subgroups. Also, correlations are Pearson.

References

Goodson, Barbara Dillon & Hess, Robert. The effects of parent training programs on child performance and parent behavior. Stanford University, undated mimeograph.

Gordon, et al. Research report of parent oriented home-based early childhood education program. Institute for Development of Human Resources, May, 1975.

Koretz, Daniel, Royce, Jacqueline & Beller, E. Kuno. Socialization for school success: The long-term impact of early intervention on values, motivation and actual school performance. In D. McClelland (Ed.), Education for values, in press.

Lazar, I., Hubbell, V.R., Murray, H., Rosche, M. & Royce, J. The persistence of preschool effects: A long-term follow-up of fourteen infant and preschool programs. Final report, Grant No. 18-76-07843, to the Administration for Children, Youth, and Families, Office of Human Development Services, U.S. Department of Health, Education and Welfare. September, 1977.

Acknowledgements

The authors would like to thank Richard Darlington for his methodological consultation; Harry Murray and Virginia Ruth Hubbell for their preliminary work with this data; Ann Bell and Marjorie Wikerd for their clerical assistance; and the Consortium members for their cooperation: Kuno Beller, Martin & Cynthia Deutsch, Ira Gordon, Susan Gray, Merle Karnes, Irving Lazar (Chairman), Phyllis Levenstein, Louise Miller, Francis Palmer, David Weikart, Myron Woolman, and Edward Zigler.